

Claims

We claim:

1. A heat pipe wick structure comprising:
  - a rigid substrate including a surface,
  - porous wick material affixed to the surface of the rigid substrate,
  - a rigid exoskeleton including pores affixed to the porous wick material whereby the porous wick material is disposed between the rigid substrate and the rigid exoskeleton,  
5 and
  - at least one rigid element separating the rigid exoskeleton from the rigid substrate.
2. The heat pipe wick structure of claim 1 wherein the porous wick material is stainless steel felt.
3. The heat pipe wick structure of claim 2 wherein the rigid exoskeleton and the rigid substrate comprise metal.
4. The heat pipe wick structure of claim 3 wherein the rigid exoskeleton, the porous wick material, and the rigid substrate are all sintered together.
5. The heat pipe wick structure of claim 4 further comprising brazing material between the porous wick material and elements selected from the group consisting of
  - the rigid exoskeleton,
  - the rigid substrate, and
  - both the rigid exoskeleton and rigid substrate.
6. The heat pipe wick structure of claim 4 wherein elements selected from the group consisting of
  - the rigid exoskeleton,
  - the rigid substrate, and
  - both the rigid exoskeleton and rigid substrate  
5 are grit blasted.

7. The heat pipe wick structure of claim 5 wherein elements selected from the group consisting of
  - the rigid exoskeleton,
  - the rigid substrate, and

5 both the rigid exoskeleton and rigid substrate  
are grit blasted.
8. The heat pipe wick structure of claim 1 wherein the wick material is nonmetallic.
9. The heat pipe wick structure of claim 2 wherein the wick material is selected from the group consisting of wood, plastic, non-wood natural fibers, non-wood natural cells, non-plastic man-made fibers, and non-plastic man-made cells.
10. A method of heat pipe wick manufacture comprising the steps of
  - positioning metal felt adjacent to a metal substrate,
  - positioning a porous metal exoskeleton member adjacent to the metal felt  
whereby the metal felt is between the metal substrate and the porous metal  
exoskeleton member, and
  - applying heat sufficient to cause the metal felt to adhere to both the porous  
metal exoskeleton member and the metal substrate.
11. The method of claim 14 further comprising a step selected from the group consisting of
  - applying brazing material between the metal felt and metal substrate,
  - applying brazing material between the metal felt and the porous metal  
exoskeleton member, and
  - applying brazing material between the metal felt and metal substrate as well as  
between the metal felt and the porous metal exoskeleton member  
prior to the step of applying heat.
12. The method of claim 14 further comprising the step of grit blasting elements selected  
from the group consisting of
  - the metal substrate,

- the porous metal exoskeleton member, and  
5 both the metal substrate and the metal exoskeleton member  
prior to the step of applying heat.
13. The method of claim 15 further comprising the step of grit blasting elements selected from the group consisting of  
the metal substrate,  
the porous metal exoskeleton member, and  
5 both the metal substrate and the metal exoskeleton member  
prior to the step of applying heat.
14. The method of claim 16 wherein a temperature of 1100 C is attained by the metal felt, the metal substrate, and the porous metal exoskeleton member during the step of applying heat.
15. The method of claim 17 wherein a temperature of 1100 C is attained by the metal felt, the metal substrate, and the porous metal exoskeleton member during the step of applying heat
16. A method of heat-pipe wick manufacture comprising the steps of  
positioning wick material adjacent to a rigid substrate, and  
positioning a rigid porous exoskeleton member adjacent to the wick material  
5 whereby the wick material is between the rigid substrate and the rigid porous exoskeleton member.
17. The method of claim 16 further comprising the step of bonding the wick material to both the rigid substrate and the rigid porous exoskeleton member.
18. The method of claim 17 wherein said step of bonding is accomplished using an adhesive applied in a single step after the wick material, the rigid substrate and the rigid porous exoskeleton member have been assembled.

**19. The method of claim 18 wherein said step of bonding is accomplished using adhesive applied in more than one step in the course of assembly of the wick material, the rigid substrate and the rigid porous exoskeleton member.**

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